



School of Medical Sciences Seminar Series

Wednesday the 9th of September 2020

3:00 – 4:00pm Microsoft Teams

We ask all attendees to mute and turn off their video

Dr Jason Kovacic

‘Understanding the Cause of Fibromuscular Dysplasia and Spontaneous Coronary Artery Dissection’

Bio: Dr Kovacic graduated from The University of Melbourne Medical School in 1994, and then undertook residency and cardiology specialty training at St. Vincent’s Hospital in Sydney. Jason then completed a PhD at the Victor Chang Cardiac Research Institute, focusing on the application of cell therapy to treat patients with refractory ischemic heart disease. In 2007 Dr. Kovacic relocated to the USA, to the National Heart, Lung and Blood Institute (NHLBI) at the National Institutes of Health (NIH) in Bethesda, Maryland. At the NIH, Jason undertook a 2 year postdoctoral fellowship with the then Director of the NHLBI, Dr. Elizabeth Nabel. In 2009 Jason moved to Mount Sinai in New York. As a physician-scientist and investigator at the Icahn School of Medicine at Mount Sinai, Jason established a cardiovascular research laboratory with a strong interest in the cellular, molecular and genetic mechanisms underlying cardiovascular disease. He also established a large clinical practice as an interventional and clinical cardiologist. Major career scientific achievements include successful investigator-initiated clinical studies of cardiovascular progenitor cell therapy, molecular characterization of a novel vascular progenitor cell population, unravelling the pathobiology of fibromuscular dysplasia and spontaneous coronary artery dissection, numerous basic and translational studies on the biology and manifestations of atherosclerosis, and pioneering studies regarding the role of endothelial to mesenchymal transition (EndMT) in adult vascular biology and disease. Jason and his lab at Mount Sinai continue to be highly active in researching these diseases.



In early 2020 Jason was recruited to return Australia, and to take on the role of the Executive Director of the Victor Chang Cardiac Research Institute. In this role, he leads one of the world’s leading Cardiovascular Research Institutes. Jason is currently in the process of establishing his research at the Victor Chang Cardiac Research Institute, where he will continue his focus on cardiac and vascular diseases, including fibromuscular dysplasia and spontaneous coronary artery dissection.

Jason has given over 60 national and international invited presentations, including in Korea, America, Mexico, England, Scotland, France, Poland, The Netherlands, Australia, Colombia, Belgium, Italy and Canada. He has received many awards and most notably in 2018 he received 2 distinct awards – one as a clinician and the other as a scientist - the Cullman Family Award for Excellence in Physician Communication (for ranking in the top 1% nationally in provider communication by CMS’s CGCAHPS patient experience survey), and the 2018 Dean’s Healthcare System Team Science Award.

Talk: Fibromuscular dysplasia (FMD) is an understudied medical enigma that can cause arterial fibrosis, stenosis, dissection, tortuosity, aneurysm, dilation and occlusion, throughout the entire body. Mean age at diagnosis is 50-55 yrs and 94% are female. Importantly, FMD is not rare - its prevalence is as high as 5% in females. FMD commonly affects the renal arteries where it may cause hypertension, while cervical or coronary artery involvement may cause stroke or myocardial infarction, respectively. Death from FMD may arise from aneurysm rupture, stroke, myocardial infarction, or from other arterial beds like the mesenteric system causing fatal gut ischemia. FMD is closely related to Spontaneous Coronary Artery Dissection (SCAD). About 50% of SCAD patients have FMD, and there are early data to suggest these diseases are very closely linked at the genetic and molecular level.

Our lack of pathobiologic knowledge of FMD and SCAD is profound. Of the little we know, from the 1970's-80's when managed surgically (and arterial samples were available) we learned that FMD involves disarray of smooth muscle cells and myofibroblasts, with increased vascular collagen and matrix. However, due to a change in management from surgery to catheter-based therapy (e.g. angioplasty), vascular samples from FMD and SCAD patients are now rarely obtained, mandating a novel approach such as patient-specific fibroblasts as in our DEFINE-FMD study. Led by Dr. Jason Kovacic and initiated in 2012, the DEFINE-FMD study is using disease-relevant samples from FMD and SCAD patients, and matched healthy control subjects, to DEFINE the molecular and cellular basis of FMD and SCAD. In the DEFINE-FMD study, we are collecting DNA, plasma, serum, fibroblast cells (via skin punch biopsy) and culture supernatant from rigorously phenotyped FMD and SCAD patients with multifocal disease and healthy controls. As of July 2020, 420 subjects have been enrolled and recruitment is ongoing.

In this talk, Dr. Kovacic will cover the findings from this study, and what this has taught us of the molecular and genetic basis of these diseases.